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Crosman Mark1 – Piercing Caps Repair and Valve Seal

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Author

Message

R-Gun Pete

Post subject: [Crosman Mark1 – Piercing Caps Repair and Valve Seal](#)

 **Posted:** Tue Nov 08, 2022 2:49 pm

offline

Joined: Tue Oct 18, 2011 12:21 pm
Posts: 591
Location: Ontario

I have two Crosman Mark1 air pistols. The first one is an older model with the lever piercing unit but the black finish is very nice and I made a set of wooden grips for it. The other is a beater that was given to me by my cousin, since the paint was all flaked it was glass beaded and now has a flat grey finish.

Those are previous post about the Mark 1
[topic43155.html](#) (Wood grips - 2 Nov. 2011)
[topic67456.html](#) (Piercing Unit - 8 April 2015)
[topic67471.html](#) (Seals - 9 April 2015)

I am in the process of going over my vintage airguns and when I tried the beater all the CO2 exhausted through the barrel and the other had a slow leak that stopped after a few minutes. Since I have now machining capability and was able to successfully manufacture several Delrin valve poppets I figured that I had two candidates for a resealing job.

I have a piercing unit that a friend had made for me that works very well but I thought that I should restore both original piercing caps.

Let's say that both rolled spring steel pins gave me a hard time and represented a fair amount of wasted time. Finally I was successful in removing the pin from the piercing cap with the lever but the one with the large button was a total failure. I think that the rolled pin is now totally welded in. Luckily for this last one the piercing needle o-ring can be accessed from the other side.

On the other hand, for the style with the lever piercing cap (with the lever, piercing pin and spring removed) to access the piercing needle o-ring, the piercing guide nut that keeps it captive must be removed. I was expecting that it should be finger tight but, after making a tool to unscrew it, I soon discovered that it was not. I bent my tool and finally damaged the small notches, so it became impossible to remove it. I realized after the fact that there were some warnings concerning the possibility of it happening. That was another time-consuming failure.

Attachment:



01.JPG [98.84 KiB | Viewed 428 times]

At this point, the only option left was to drill out the piercing guide nut. The internal thread of the piercing body is 7/16-20 and luckily the minor diameter is slightly over 3/8 inch so I was able to use a carbide endmill to remove the material. I was not sure how deep to go without damaging the o-ring seat because I couldn't find any information. In fact, I didn't have to worry because the lowest part of the guide is .370 inch in diameter and just started to spin when the last thread was cut.

To make a replacement I had to guess the dimensions depth wise. I also decided to use aluminum because if there is a problem in the future it would be easier to machine out. I basically started by threading the end of the shaft with a 7/16-20 die on a distance long enough to make two parts. The total length of a finished piercing guide nut is around .430. On the end closer to the o-ring, the thread is removed on a distance of .130 inch and reduced to a diameter of .370 inch. On the other end (where the tip of the CO2 cartridge goes) the depth of the cavity is about .210 inch. The sequence was to drill 1/8 inch through all, then continue with a 3/16 drill to start the larger opening and finish with a 3/16 endmill to have a flat bottom at the right depth.

Attachment:



02.JPG [115.62 KiB | Viewed 428 times]

Now with both piercing caps out of the way it was time to look at both valves. The beater had the seal of the poppet replaced in the past and none of the material I have tried would work as a long-term fix. The plastic from yougourt or Nestley Quick lids and the plastic from clear flexible tubing will work for some time but eventually fails. Based on the dimensions of the cutouts I made in the flexible tubing my friend machined me a couple of small donuts from what I think was black Delrin. It was now time to try it.

Using a small jig to hold the valve poppet, I drove out the pin from the brass head, removed the old seal and replaced it by the black Delrin. After reassembly the airgun leaked through the barrel and I finally decided to make a new valve poppet similar to the others I machined previously. The head would be a single piece Delrin with a steel stem. For the Mark1, the 1/8 inch steel rod I had was too big by a thou or two. Luckily, I had a few Dremel grinding bits with worn off heads but long enough for what I

needed and the fit was right on.

This time the leak was gone and I was ready to tackle the other one (the black pistol). When I ordered the Delrin from Aircraft Spruce (at the suggestion of Killercrow), I didn't know what I would need so I purchased several feet in two different diameters: 1/2 and 3/8 inch. Until now all the replacements I machined were full head and it required the use of the 1/2 diameter rod. For the second Mark1 repair I decided to have an aluminum head with a Delrin insert. The idea was that if the stem is in a blind hole in the Delrin, even if it is a two-part head, it shouldn't leak.

The aluminum head had the 3 levels cut on the lathe and a cavity 3/16 inch diameter by .220 deep made with a endmill then the Delrin had 2 levels also cut on the lathe and a hole .300 deep drilled with a #37 (.104). The level with the sealing face was diameter .370 and the tail was .1875 (or should have been). I just cut a bit too much and the fit was very loose in the head. With a bit of shimming it was holding in place and the pistol was reassembled.

Attachment:



03.JPG [157.4 KiB | Viewed 428 times]

After piercing the CO2 cartridge, No Luck! Total leak through the barrel. It was not making sense and I didn't want to give on my idea of the two-part head, so disassembly, back to the lathe and new insert with a better fit this time. After analyzing what could have been wrong (I didn't want to waste another CO2 cartridge), I thought that to be on the safe side I would warm up the Delrin seat with the heat gun then place it in the valve and tap it firmly with a hammer. Furthermore instead of just using a bit of silicone grease I also added a copious amount of Pellgun oil. After reassembly, it worked fine and was still holding after a day.

R-Gun Pete

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